



Mississippi Department of Agriculture and Commerce

FY 2008 Specialty Crop Block Grant Program

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Final Performance Report

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Introduction

The Mississippi Department of Agriculture and Commerce (MDAC) was awarded \$107,038.75 in funding for the FY2008 Specialty Crop Block Grant Program (SCBGP) in June 2009. MDAC implemented eight projects to enhance the competitiveness of specialty crops throughout the state: *Off-Season Production of Strawberries*, *Assessment of the Market Potential for Medicinal Herbs Grown in Mississippi*, *Green and Sustainable Initiative*, *Investigation of Best Management Practices for Specialty Cut Flower Production*, *Developing Specialty Crop Education in Mississippi*, *Beekeeping Cost-Share Program*, *Year-round Production in High Tunnels: Crop Selection, Scheduling, and Culture*, and *Farmers Market Promotion and Certification*.

Final reports for the two following projects: *Beekeeping Cost-Share Program* and *Developing Specialty Crop Education in Mississippi* were previously submitted in the FY2008 Second Annual Performance Report in 2011.

OFF-SEASON PRODUCTION OF STRAWBERRIES

Project Summary

Open field culture is the standard method used to produce strawberries in the U.S. But in many of the winter and early spring production areas outside the U.S., strawberries are grown under clear plastic tunnels. In Spain, the second largest producer of strawberries in the world, almost all strawberries are grown in tunnels. The Spanish industry uses tunnel culture to advance the season by creating a warmer environment and protects ripening fruit from damage by winter rains.

There is a highly profitable market for strawberries in the off-season from October through February since domestic supply is low and demand is high. Fruit is currently imported into Mississippi from Southern Florida or California at extremely high prices during this time period. High tunnel production of strawberries represents an opportunity for Mississippi growers to expand into this time frame.

Normally strawberry plants are set in the field in October for production in April and May. However, as the strawberries enter the short days of fall, they will flower and start producing fruit in November only to have flowers and underdeveloped fruit destroyed by early winter freezes. High tunnels could possibly be used to prevent this destruction and allow for the fruit to mature for the Thanksgiving through New Year's holiday season market. Also, other research has found that harvest of strawberries grown in high tunnels is 2 – 3 weeks earlier in the spring than those grown out-of-doors.

By having production in the fall and an earlier production in the spring, growers would receive additional income at premium prices, be able to spread out their investments, help maintain market share, have frost protection, which would potentially save the crop, and provide additional work for farm workers, thereby putting more money into the local economy.

This project is being implemented by the Mississippi State University Extension Service (MSU-ES) along with a grower/cooperator. The goal of this project is to examine cultural practices necessary for the off-season production of strawberries in Mississippi. This project will 1) evaluate the general use of high tunnels for fall frost protection and fruit production and increase early spring season strawberry production, 2) examine the potential of different strawberry genotypes for fall fruiting, and 3) develop a protocol to maximize yield for off-season production.

This project does not build upon a previously funded SCBGP project.

Project Approach

In the Fall of 2009, site preparation for the study began; strawberries were planted and the high tunnel was erected. In October, the grower/cooperator limed and fertilized the area where the high tunnel was to be established. Shortly afterward, he fumigated and covered the planting area with black polyethylene. Drip irrigation tape was installed at this time also.

On October 20, plug-grown strawberry plants were transplanted into the area to be covered by the high tunnel. Strawberries were also planted in an area outside the tunnel for comparison. The planting date was about 10 days later than previous years because of rainy weather. The strawberry cultivars planted were 'Camarosa,' 'Sweet Charlie,' and 'Florida Festival.' Sweet Charlie was selected because it was reported to be an early producing cultivar. Camarosa was the cultivar that the grower/cooperator has been growing for several years. Florida Festival was chosen because of its success in Florida and Louisiana.

In November 2009, the high tunnel kit was installed on the grower/cooperator's farm. The grower/cooperator provided most of the labor for the erection of the high tunnel. He also managed the day-to-day opening and closing of the high tunnel, fertigation, and spraying of insecticides and fungicides.

One of the initial goals of this study was to limit strawberry production in December in the high tunnel. With the delays in planting, high tunnel erection, and unusually cold temperatures, growth of the strawberry plants were therefore delayed as well. When temperatures below freezing were predicted, the plants outside the high tunnel were covered with a spun-bonded polyester row cover, to prevent cold damage. When temperatures were predicted to go below 20° F, the plants inside the tunnel were also covered. Due to the below normal temperatures, the high tunnel was essentially closed during December and January.

The addition of the row cover provided enough additional warmth to the strawberry plants inside the high tunnel that they began blooming in December. Since the tunnel was closed most of the time due to cold temperatures, a leaf blower was utilized to blow the flowers to encourage pollination. Occasional ripe berries were seen during the first week of January. Strawberries were first harvested inside the high tunnel for data on January 28, 2010. Harvesting of strawberries continued until May 20, 2010. The plots outside the high tunnel were harvested from March 29 to May 20. By May 20, daily temperatures were exceeding 85° F, and fruit set was not occurring so harvest was concluded.

The cultivar 'Sweet Charlie' produced the earliest yields beginning about a week before the other cultivars. Subsequent harvests were made every five to ten days until March 4, 2010, when plots were harvested two times per week.

The following table is a comparison of the marketable yield for the strawberries planted inside of the high tunnel to that of those planted outside of the high tunnel.

	Marketable Yield (lb./Acre)			
	Inside High Tunnel			Outside High Tunnel
Cultivar	Yield Prior to 3/29*	% of Yield Harvested Prior to 3/29	Total Yield	Total Yield
Florida Festival	2,771	23.6	11,718	8,164
Camarosa	3,067	21.3	14,399	12,572
Sweet Charlie	2,756	39.0	7,071	6,367

*Harvest of strawberries outside of the high tunnel began on March 29.

Sweet Charlie was the earliest maturing cultivar, but it was also the lowest yielding cultivar, both inside and outside of the high tunnel. The fruit tended to be more orange than red in color and produced more cull fruit than the other cultivars.

Florida Festival was two days earlier than Camarosa in maturity. It also produced higher marketable yields in the high tunnel than outside. Part of this was due to rainy weather problems which will be discussed later. This cultivar had a good red color, but toward the end of the harvest season, fruit size was very small.

As previously mentioned, Camarosa had been grown by the grower/cooperator for the previous five years. It produced a large red fruit and maintained good size throughout the harvest season. It also produced a slightly higher marketable yield in the high tunnel than outside. Part of this was due to rainy weather problems which will be discussed later.

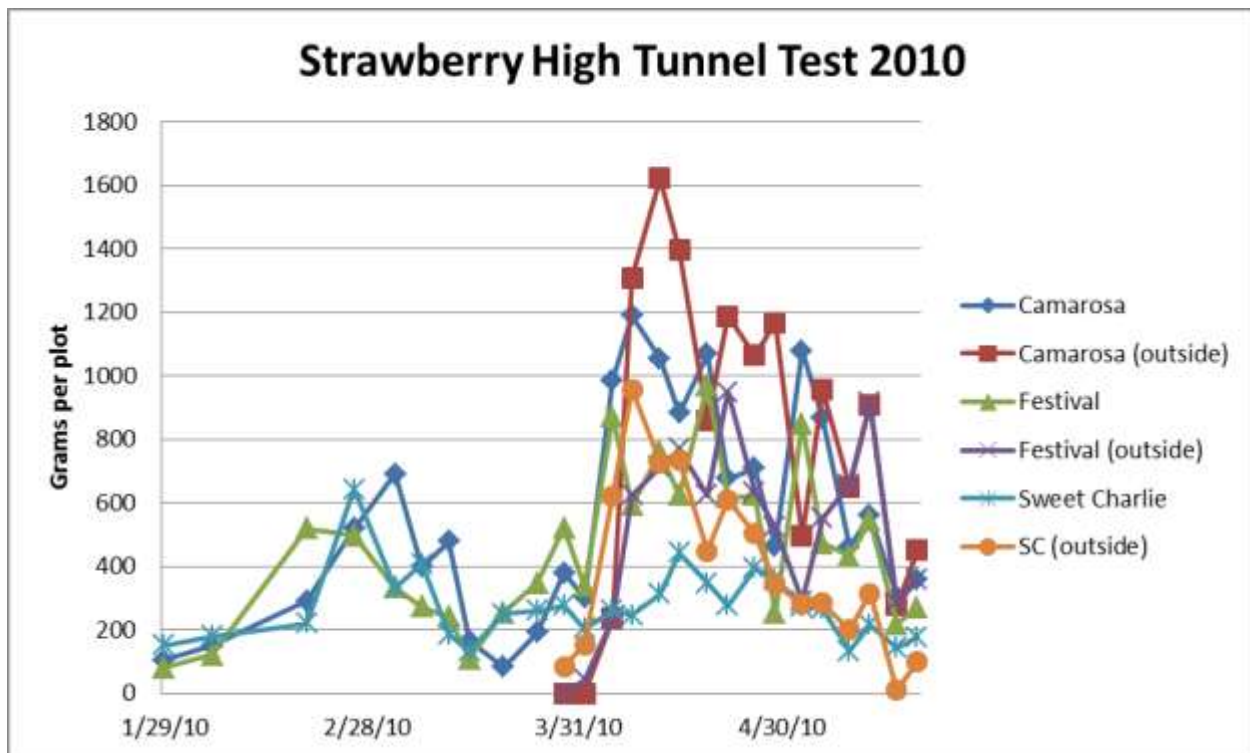
The 'rain-shield' effect of the high tunnel was clearly demonstrated during these two rainfall events. This is shown in the table below.

	Marketable Fruit					
	Inside of the High Tunnel			Outside of the High Tunnel		
Cultivar	% on 5/3	% on 5/6	% on 5/17	% on 5/3	% on 5/6	% on 5/17
Florida Festival	100	100	100	31.4	98.3	79.4
Camarosa	98.9	97.5	97.5	36.5	88.3	49.0
Sweet Charlie	98.0	85.9	85.9	71.2	94.4	5.8

The columns in the table summary titled % on 5/3, % on 5/6, and % on 5/17 indicate the percentage of marketable fruit following significant rainfall events on May 1 and 2 and again on May 16. Inside the tunnels, there was minimal damage due to blown-in rain, except to Sweet Charlie. Outside the tunnel, Sweet Charlie fared better than the other cultivars in the May 3 harvest and had recovered by the May 6 harvest. The rain occurring before the May 17 harvest was particularly damaging to Sweet Charlie possibly because of high temperatures.

The May 1-2, 2010 rain was particularly damaging to Florida Festival and to Camarosa. They did recover by the next harvest. Florida Festival produced more marketable fruit than the other cultivars after the May 16 rainfall, probably because the fruit was smaller in size than the fruit of the other cultivars.

The graph below shows the yield distribution throughout the growing season for the different cultivars inside and outside of the tunnel.



As a general rule, total yield of strawberries grown in the high tunnel was spread out over a longer period of time than the plants grown outside the high tunnel. This was not anticipated. It was assumed that the bulk of the yield of plots in the high tunnel would be produced earlier in the growing season. The high tunnel plus supplemental coverings provided a minimum 8 week advance in harvest.

In July 2010, the grower/cooperator ordered plug-grown plants for planting in October. In September the high tunnel was prepared for planting strawberries. Previous season's plastic was removed and the soil was tilled to destroy any weeds present. The planting area was then fertilized, fumigated, and covered with black polyethylene mulch. Drip-tape was also installed at this time.

On October 18, 2010, the strawberry plugs were transplanted. In addition to the cultivars planted last year, 'Camarosa,' 'Festival,' and 'Sweet Charlie,' a new cultivar, 'Camino Real,' was included in the trial. The planting was a replicated trial with three replications inside and three replications outside the high tunnel. Standard fertigation and spray schedules followed.

In November 2010, spider mites were discovered in the test plot area of the high tunnel. They apparently originated on the Camino Real plants and spread into surrounding test plots. The grower/cooperator initiated a spray program to control them. Three applications of miticides were made during the remainder of the growing season. The infected plants never fully recovered. Fruit yield and size were reduced.

The 2010 – 2011 winter weather was not as cold as the previous year's winter. During the coldest weather of late December and early January, the strawberries (inside and outside the high tunnel) were covered with Agri-bond cloth to provide more cold protection.

Occasional ripe berries were seen in the high tunnel during January. Strawberries were first harvested for data on February 9. There was no clear-cut advantage among cultivars for

earliness in 2011. Twice weekly harvests began the week of February 17.

Plots outside the high tunnel were first harvested on March 21, 2011. Deer grazing delayed harvest by about 2 weeks.

The following table is a comparison of the marketable yield for the strawberries planted inside of the high tunnel to that of those planted outside of the high tunnel.

	Marketable Yield (lb./Acre)			
	Inside High Tunnel			Outside High Tunnel
Cultivar	Yield Prior to 3/21*	% of Yield Harvested Prior to 3/21	Total Yield	Total
Florida Festival	2,202	26.3	8,358	7,615
Camarosa	614	9.5	6,442	12,173
Sweet Charlie	1,509	32.3	4,676	7,584
Camino Real	858	15.2	5,658	10,366

*Harvest of strawberries outside of the high tunnel began on March 21.

In spite of the spider mite damage, trends for early production followed the same pattern as 2010. The Sweet Charlie cultivar produced nearly one- third of its total yield in the high tunnel prior to the harvest outside. It was followed by Florida Festival which produced 26.3% of its high tunnel yield before the outside harvests began.

Florida Festival had the highest marketable yield inside followed by Camarosa, Camino Real, and Sweet Charlie. Outside the high tunnel the order of yield from highest to lowest, was as follows: Camarosa, Camino Real, Florida Festival, and Sweet Charlie. This was the same order as in 2010 except Camino Real was not grown in 2010.

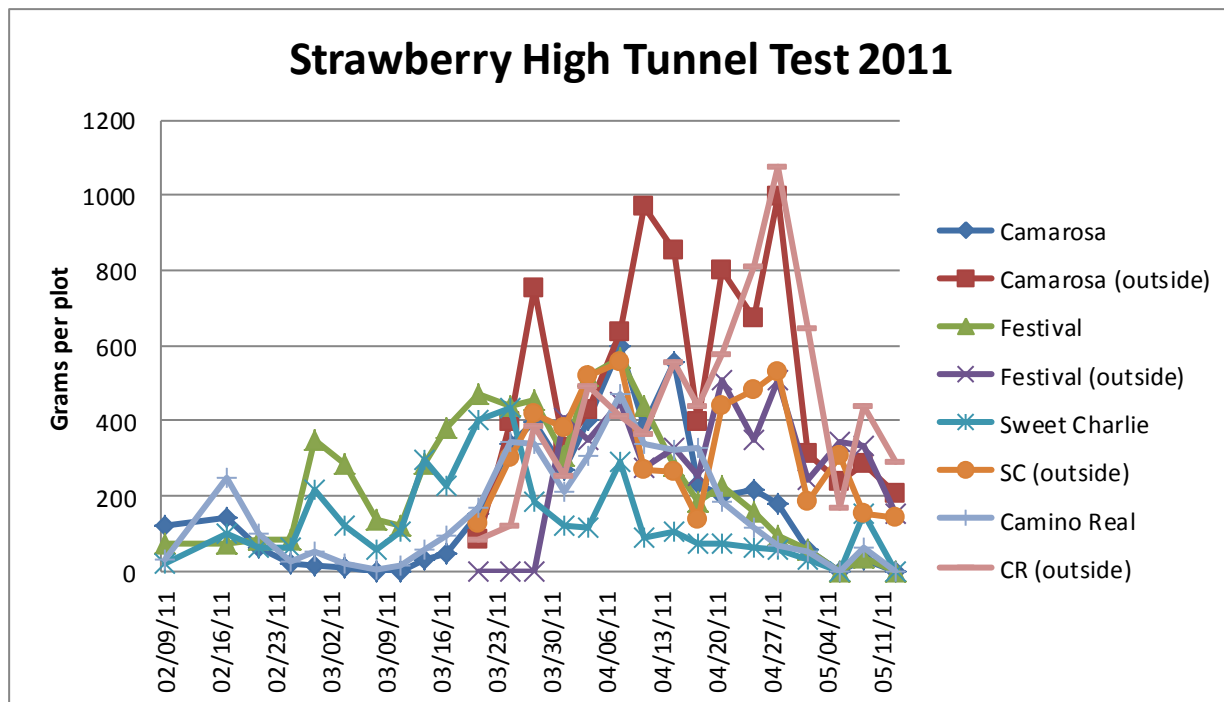
The following table explains the relationship of marketable versus cull fruit among the cultivars inside and outside the high tunnel. One of the challenges of growing strawberries in the high tunnel is pollination. When the tunnel is closed, bees and other pollinating insects are unable to enter. Last season we discovered that blowing the strawberry flowers with a gasoline powered leaf-blower once a week would substitute for insect pollination. As the weather warmed up, the sides were rolled up and pollinating insects had free access to the strawberry flowers.

	Yield lb./A					
	Inside of the High Tunnel			Outside of the High Tunnel		
Cultivar	Mkt	Cull	% Cull	Mkt	Cull	% Cull
Florida Festival	8,358	1,623	16.2	7,615	859	10.1
Camarosa	6,442	1,975	23.5	12,173	900	6.9
Sweet Charlie	4,676	2,256	32.5	7,584	1,413	15.9
Camino Real	5,658	801	12.4	10,366	332	3.1

The fruit that was designated as culls were either misshapen or too small to be considered marketable. Sweet Charlie produced the highest percentage of cull fruit inside and outside the high tunnel. This also occurred in 2010. All cultivars had more cull fruit inside the tunnel than outside. This was a result of poorer pollination and spider mite damage.

Camino Real produced high quality fruit outside the high tunnel and will be further tested. Camarosa continues to be a dependable cultivar and is grown by the grower/cooperator in his production fields.

The graph below shows the yield distribution of the different cultivars throughout the growing season inside and outside the tunnel.



As a general rule, total yield of strawberries grown in the high tunnel was spread out over a longer period of time than the plants grown outside the high tunnel. This was not an anticipated results; it was assumed that the bulk of the yield of plots in the high tunnel would be produced earlier in the growing season. The high tunnel, plus supplemental covering, provided about a 3 week harvest advantage in 2011.

This project would not have been possible without the effort and support of Mr. Randy Mathis of Mathis Produce. Mr. Mathis provided the majority of the labor for installing the high tunnel and maintaining it on a daily basis. He supplied all the plants, plastic, irrigation supplies, and often times, harvest labor for the project.

Based on the two years of study, strawberries can be grown successfully in high tunnels, but a higher level of management is required.

- 1.) Growers must understand nuances of temperature control. When no freezing weather was predicted, the grower/cooperator often left the high tunnel open at night. Heat that would have sped up maturity of the crop was therefore lost.
- 2.) Insect pests must be monitored more closely. Since they are not exposed to natural predators when the tunnel is closed, detrimental populations can build up rapidly.

Goals and Outcomes Achieved

One goal that was not achieved was the idea that growing the strawberries in a high tunnel would allow berries to be produced in the late November – December time frame. Future research could test this if plants are set in September.

Another goal not fully achieved was the evaluation of day neutral cultivars of strawberries in the high tunnels. The grower/cooperator did not have a supply source for these plants.

Growing strawberries in the high tunnel did allow for earlier harvests in the spring by eight weeks in 2010 and three weeks in 2011. Moderation of temperatures in the high tunnel in the very cold winter of 2009 -2010 allowed for an earlier yield, a benefit to high tunnel production.

Another positive benefit of high tunnel was protection of strawberry fruit from damage due to repeat rainfall events in 2010. The 'rain shield' effect of the high tunnel increased marketable yields by 20–80%.

Beneficiaries

Information from this research will benefit anyone wanting to grow strawberries whether it is inside or outside of a high tunnel in Mississippi. In the Fall of 2011, at least 2 known new producers were growing strawberries in high tunnels. Having strawberry plots outside the high tunnel provided information on varieties that performed better under Mississippi growing conditions. This is important for making recommendations to new growers.

During the period of early harvest in the high tunnel as opposed to the outdoor plots both years, the prices of strawberries in local grocery stores were \$0.50/pound higher than what the grower received during the normal growing season.

The following table represents what this value (\$/acre) would represent based on the research trials. This is income being received when the producer would not normally receive any income.

	Economic Advantage of High Tunnel at \$0.50 early season price advantage (\$/acre)		
Cultivar	2010	2011	2-yr Average
Florida Festival	1,386	1,101	1,244
Camarosa	1,534	307	920
Sweet Charlie	1,378	755	1,067
Camino Real	---	429	429

Lessons Learned

The most important lesson learned in this project was a lot of time was needed to open, close, and adjust the openings of the high tunnel in order to regulate the inside temperature. It was difficult to increase or decrease temperatures in small increments. High tunnels need to be located close to the grower's home or work site.

It is also important to have a good irrigation system in place that operates independently of crops areas outside the tunnel. Management levels are much greater than in a conventional greenhouse.

High tunnel production of strawberries will allow growers to spread out their investment over a longer period of time, provide additional work for farm labor and therefore putting more money into the local economy, and potentially receive higher prices for their crop. Growers interested in high tunnel production should have severe cold/frost protection which can potentially save crops.

Unexpected problems over the course of the project included spider mites discovered in November 2010 in the test plot area of the high tunnel. They originated on the Camino Real plants and spread into surrounding test plots. The grower/cooperator initiated a spray program to control them. Three applications of miticides were made during the remainder of the growing season. The infected plants never fully recovered. Fruit yield and size were reduced.

Also during November 2011, the test plots outside the high tunnel were grazed on by deer. Most plants were eaten to the ground before an electric fence was erected. The plants recovered but harvesting was delayed about 2 weeks.

The last unexpected problem was wind damage to the covering on the high tunnel. High winds during a thunderstorm bent metal rods on the rollup doors then pushed them through the covering. This was repaired but a subsequent storm blew the entire top covering off. As a result of this, no strawberries were planted in the high tunnel in the Fall of 2011. There was no money to replace the covering.

Contact Person

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Additional Information

Information gained from the projected was presented to the following groups:

Mississippi Fruit and vegetable Growers Association, February, 2011, 'Strawberry production in Mississippi' – 35 participants

Second Annual High Tunnel Workshop, 'High tunnel fruit research update', March, 2011 – 65 participants

Mississippi Association of County Agricultural Agents, Professional Improvement Conference, August, 2011, 'Plasticulture production of strawberries' – 8 participants

Northeast Mississippi Fruit and Vegetable Growers Conference, 'Growing fruit in high tunnels, February, 2012 – 15 participants

A publication entitled 'Suggestions for growing strawberries in high tunnels' is in preparation.

ASSESSMENT OF THE MARKET POTENTIAL FOR MEDICINAL HERBS GROWN IN MISSISSIPPI

Project Summary

This project conducted an assessment of the current market opportunity and potential for medicinal herbs, particularly Echinacea and lemon grass, grown in Mississippi. Herbal therapeutic supplements have witnessed increasing growth amongst our country, as many Americans look for herbal supplements in addition to their diets. This project is relevant in that the technology to grow these crops exists; however, in order to invest in production and value-added product development, producers desire reliable information on the demand, market opportunities and access, and profitability. Based on knowledge gained over the last ten years of developing a natural products industry in Mississippi, the project design and implementation team has shown great interest in a potentially successful niche market for Mississippi grown medicinal herbs. This project is an essential first step in building this industry since producers typically and rationally respond to effective demand for a product.

This project does not build upon previously funded projects.

Project Approach

The main activities and tasks used in implementation of this project included market research and data collection to determine the potential market opportunity for medicinal herbs. A review of the existing literature on lemon grass and Echinacea was required in order to establish a background of the industry and the plants itself, including extension publications and reviews from other university researchers from North Carolina State, University of Missouri-Columbia, and Cornell. The Mississippi Natural Products Association (MNPA), located in New Hebron, Mississippi offered insights on its experience of medicinal herbs, including, Echinacea, Valerian, Feverfew, Catnip, Lemon Grass, and Shiitake mushrooms. The MNPA has discovered there is a demand for medicinal herbs and dietary supplements; with those grown fresh and locally being more potent with the desired level of beneficial chemicals.

The project team furthered their knowledge and research at the Natural Products Expo East in September 2009 in Boston, Massachusetts. The project team interacted with members of the industry, observed displays/exhibits and products, and gained knowledge on purposed of these herbs. Discussions included aromatherapy, botanical extracts, children's remedies, encapsulated/tableted herbs, flower essences/remedies/full line herbs, medicinal products, homeopathic remedies, medicinal teas, naturopathic remedies, and organic herbal remedies. According to the *Natural Foods Merchandiser 2008 Market Overview*, the Northeast is the leader in natural product sales, holding 19.7 percent of retail sales.

After sufficient research was conducted, the survey was designed. The survey was made in Word format and developed using the *Survey Monkey* website, the link: <http://www.surveymonkey.com/2J83955>. This survey was emailed to industry experts, industry associations, ingredient brokers/suppliers, distributors, farmer markets, grocers, restaurants, nurseries and related entities. However, only 15 questionnaires were valid responses out of the 60 surveys distributed. In order to gather more responses, other measures were taken including subsequent mailings, phone surveys, and in-person interviews.

The project team traveled to various Farmers Markets, including Natchez, MS, Red Stick Farmers Market in Baton Rouge, LA, and the Crescent City Farmers Market in New Orleans, LA. After responses gathered from the first visit to the Natchez Farmers Market, the survey instrument was then revised so it would be more relevant to current/potential consumers of medicinal herbs.

With this new survey format, 79 responses were gathered; 24 from vendors and 55 from consumers. Collected data was compiled into a database and analyzed using Statistical Package for the Social Sciences (SPSS).

In order for ASU to better understand the current market, they contacted with the Mississippi Hospitality and Restaurant Association (MHRA) in Flowood, Mississippi. They assisted with sending out an email blast to over 400 specialty/upscale restaurants in Mississippi and obtained the following responses. Six Asian restaurants replied and indicated they use 25 lbs. of lemongrass per week, totaling 100-125 lbs. per month, and they purchase from various produce companies. Other restaurants indicated that lemongrass is only purchased for specials on their menus. The Deputy Director with Market Umbrella and The Crescent City Farmers Market in New Orleans, Louisiana indicated that farmers from the North Shore in New Orleans carry fresh lemongrass regularly to market; local chefs and farmers' market customers purchase lemongrass on a weekly basis.

Goals and Outcomes Achieved

The goal of this project was to assess the current market opportunity and potential for medicinal herbs, particularly Echinacea and lemon grass grown in Mississippi. A survey instrument was designed in order to formally assess the marketing potential in Mississippi. From the in-person interviews conducted, 79 responses were obtained, 24 which were from farmers market vendors and 55 were from consumers. Data was converted into a database where it could be analyzed to generate results in SPSS.

Out of the 79 responses obtained, 31 were usable surveys. When respondents were questioned on their familiarity of herbs surveyed (lemongrass, Echinacea, valerian, and catnip), 100% of respondents had heard of one, more than one, or all of the above.

The survey questioned respondents on the health benefits of these four herbs. In particular, two (6.5%) respondents were aware of the health benefits of lemongrass and four (12.9%) were aware of the health benefits of Echinacea.

Of the respondents, 28 or 90.3% had in fact purchased one of these four herbs previously, while 7 or 22.6% had purchased lemongrass and 8 or 25.8% had purchased Echinacea.

Most purchases of these four herbs were made in raw bulk (38.7%) or processed roots form (32.3%). 58.1% of these buyers purchased their herbs from a retailer.

14 respondents or 45.2% of those surveyed had purchased Echinacea in the past year, 9 of these respondents did so 1-3 times, 2 purchased Echinacea 4-6 times, and 1 purchased Echinacea more than 10 times.

11 respondents or 35.5% of respondents purchased lemongrass sometime over the past year, 7 of these purchased lemongrass 1-3 times, 2 purchased lemongrass 4-6 times, and 1 had purchased lemongrass more than 10 times over the past year.

From these survey results, consumers are aware of the health benefits of lemon grass and Echinacea. Even though a small number of respondents were analyzed, it is evident there is a market available for this industry.

Beneficiaries

Direct beneficiaries of the project will be the farmers and consumers that will be supplying and demanding lemon grass and Echinacea. Results of this study will be posted in at least one (1) magazine, five (5) newspapers, four (4) newsletters, and on seven (7) websites. This study has not yet been published. By posting the project findings on various websites, the information will be readily available to the region and nation. Alcorn State University's Mississippi Small Farm Development Center is affiliated with thirteen (13) active farmer cooperatives in the state of Mississippi, and they will be given information from the project, to further reach a larger market.

Lessons Learned

Obtaining secondary data proved harder than initially expected. Data therefore had to be collected by the project team itself. Implementation of an email survey had a poor response rate. The survey instrument was then revised to meet the criteria for the new audience being surveyed: farmers market vendors and customers.

Contact Person

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Additional Information

Below is the in-person survey conducted to vendors and consumers at farmers markets:

Assessment of Market Potential for Herbal Plants

Name: _____
Phone Number _____ Email: _____

1. Which of these products are you familiar with?
 - ☐ Lemongrass
 - ☐ Echinacea
 - ☐ Catnip
 - ☐ Valerian
 - ☐ All the above

- None of the above
- 2a. Are you aware of the health benefits of any of these herbs?
- Yes
 - No
- 2b. If yes to the above, which one?
- Lemongrass
 - Echinacea
 - Catnip
 - Valerian
 - All the above
- 3a. Have you ever purchased any of these herbs?
- Yes
 - No
- 3b. If yes to the above, which of these herbs have you ever purchased?
- Lemongrass
 - Echinacea
 - Catnip
 - Valerian
 - All the above
 - None of the above
- 3c. In which form did you purchase the herb above?
- Raw bulk plant material
 - Processed roots
 - Plant extract
 - All the above
 - Other (specify) _____
4. From which supplier do you normally purchase herbal products?
- Processor or wholesale manufacturer of raw plant materials
 - Processor or wholesale manufacturer of extract or prepared plant materials
 - Retailer
 - Other (specify) _____
- 5a. How many different herbal suppliers are you aware of?
- 1-5
 - 6-10
 - 10-15

- 16 or more

5b. If you answered Q5a above, can you provide any supplier's name?

6. Indicate which of the following products you have purchased in the past year and for those products, please answer the following questions.

Products	Catnip	Echinacea	Lemongrass	Valerian
	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No
<u>IF YES:</u>				
a. How many times a year do you purchase?				
b. Average price? (Please indicate dollar value)				
c. Form(s) of plant material purchased during last year?	<input type="radio"/> raw <input type="radio"/> ground <input type="radio"/> extract <input type="radio"/> all the above <input type="radio"/> other	<input type="radio"/> raw <input type="radio"/> ground <input type="radio"/> extract <input type="radio"/> all the above <input type="radio"/> other	<input type="radio"/> raw <input type="radio"/> ground <input type="radio"/> extract <input type="radio"/> all the above <input type="radio"/> other	<input type="radio"/> raw <input type="radio"/> ground <input type="radio"/> extract <input type="radio"/> all the above <input type="radio"/> other

7. If a group of farmers grew herbal products and sold them through a cooperative (co-op) under certified standards and at competitive prices compared to other suppliers, how likely would you be to consider the cooperative as your potential supplier of herbal products?

- Definitely would consider using such a cooperative
- Might consider using such a cooperative
- Probably would not consider using such a cooperative
- Definitely would not consider using such a cooperative

8. Would you like a copy of the summary report?

- Yes
- No

Thank you for your participation!

GREEN AND SUSTAINABLE INITIATIVE

Project Summary

The purpose of this project implemented by the Mississippi Nursery & Landscape Association, Inc. (MNLA) was to educate both the industry and consumers on the benefits of using native plants through educational seminars and a media campaign. Designing and promoting a “Mississippi Medallion Native Plant of the Year” on an annual basis opened the door for native plants to be placed in commercial production, complementing the project.

Current trends nationally, encourage the use of green and sustainable products. Promoting these plants and educating the consumers help both the growers and retailers by increasing demand for native plants and sustainable landscapes which results in improvements to the economy in our state, as well as using fewer resources. Therefore, the project initiated the “Green and Sustainable Initiative” by implementing a two-day conference and trade show in July 2010. This initiative increased the production and utilization of native plants and regionally adapted plants to conserve water and reduce pesticide use in Mississippi landscapes.

This project does build upon previous funding as MNLA received money the previous year (FY-Farm Bill Specialty Crop Block Grant) to promote the “Mississippi Medallion Program”. The “Green and Sustainable Initiative” promoted the “Native Plant of the Year,” aiding the entire program.

Project Approach

The Mississippi Nursery and Landscape Association debuted the “Mississippi Medallion Native Plant of the Year” in 2010. The winners, selected by MNLA, were Gulf Muhly Grass (*Muhlenbergia capillaries*) in 2010; Virginia Sweetspire (*Itea virginica*) in 2011; and Butterfly Weed (*Asclepias tuberosa*) in 2012.

MNLA implemented a media campaign to promote the “Mississippi Medallion Native Plant of the Year” to educate the consumers on why it is important to choose native plants when selecting trees, shrubs, and flowers for their property. This included:

- A 30-second “Native Plant” commercial that ran for three weeks on seven different stations across the state starting September 15, 2011.
- Press releases were distributed to media personalities to daily and weekly newspapers across the state.
- Print media, including 11” x 7” billboards, were distributed to all MNLA retail member garden centers and displayed at the Gulf States Horticultural Expo each year. Advertisements and articles were placed in the MNLA News Messenger, distributed to MNLA members quarterly.
- A website slideshow featuring drought tolerance and low pesticide plants was developed and can currently be viewed online at www.msnla.org.

MNLA held the Mid South Green Industry Conference on July 21 & 22, 2010 at the Eagle Ridge Conference Center in Raymond, MS. This conference educated 100 members on the green industry (growers, landscape designers, and garden center representatives were present). The

MNLA utilized SCBGP funds to pay for 13 speakers' travel to attend and speak at the conference. Topics by the speakers included *BioPots: Information on Growing and Landscape Use*, *Growing Plants in Rice Hull Media*, *Heating with Alternative Energy*, and *Thrip Management in the Nursery and Greenhouse*. The following topics that were covered mentioned either better plant selection for less input (water, labor, etc.) or better landscape solution for less input-- *Weeds in the Commercial Landscape - Problems and Solutions*, *Organics in the Landscape*, *Consumer Weed Control Products*, *Petunias in the Landscape: How to Use Wave Petunias and Recommended Cultural Practices*. These and other topics that were presented were pertinent to the "Green and Sustainable Initiative."

Consumers were educated about the Mississippi Medallion Program and the Native Plant of the Year through seminars held during the Gulf Coast Garden & Patio Show in Biloxi, Mississippi, held in February 2011, and the Jackson Garden & Patio Show in Jackson, Mississippi, held in March 2011. The total attendance for these two shows was 8,454.

During the Mississippi Garden & Patio Shows, consumers were educated on the Mississippi Medallion Program and the Native Plant of the Year. Consumers were surveyed at the shows, and results showed an increase in the percentage of people aware of the chosen plants.

Producers were surveyed each year to determine if there had been an increase in the number of plants produced and sold. According to the surveys conducted, production and sales of the 2010 winner, Gulf muhly grass, increased by over 36% from the previous year. The 2011 winner, *Itea virginica*, witnessed an increase of over 93% in production and sales.

MNLA members and board members played a significant role in this program by participating on committees, commercials, and displayed billboards at local retail centers. Mississippi State University Extension Service also played a major role in the development of the billboards; educating both the public and the industry at trade shows and conferences; writing about the "Native Plant of the Year" and "Mississippi Medallion Program" in various newsletters and magazines; and writing, acting, and producing the television commercials.

Goals and Outcomes Achieved

In order to achieve the performance goals for this project, MNLA worked closely with researchers of the Mississippi State University Extension Service to identify plants that would meet the criteria of the of the "Mississippi Medallion Program"/"Native Plant of the Year" and uphold its credibility. This information was compiled and presented to growers, retailers, and consumers in a way that could accurately relay the message. Surveys were developed to accurately measure the outcomes and were implemented in ways that would measure results.

MNLA feels that progress has been made in increasing the awareness of native plants and the benefits of growing, purchasing, and using them in landscapes. Over time, this will result in landscapes that require fewer resources.

Goals for this project were achieved for hosting of the 2010 Mid South Green Industry Conference, educating the industry, conducting consumer educational seminars, production of a television commercial, and a website video. Of the total 100 attendees at the 2010 conference, 18% were from MNLA Member Businesses.

The website video on drought tolerant, low pesticide plants was not able to be managed in a way to track the number of viewers because it was not uploaded in enough time. MNLA plans to continue to add drought tolerant, low pesticide plants to the video in the future to continue to educate consumers on these low maintenance plants.

Consumers were educated about the Mississippi Medallion Program and the Native Plant of the Year during seminars held during the Garden & Patio Shows. The following are the results of the consumer survey depicting the number of program attendees that had already heard of the program, the current winners, or if they could actually name a plant in the program:

Table 1. Mississippi Medallion Program Consumer Survey Result by Year

	2009 Consumer Survey	2010 Consumer Survey	2011 Consumer Survey	2012 Consumer Survey
Number of People Surveyed	121	326	312	227
Number of Persons Who Had Heard of the Mississippi Medallion Program	32 (26%)	118 (36%)	128 (41%)	92 (41%)
Number of Persons Who Had Heard of the Current Year's Winners	40 (33%)	90 (27%)	153 (49%)	113 (50%)
Number of Persons Who Could Name a Mississippi Medallion Plant	37 (30%)	32 (10%)	67 (21%)	37 (16%)

Note: Almost 53% of the 227 surveyed in 2012 had heard of at least one of the three plants named "Mississippi Medallion Native Plant of the Year" (Gulf muhly grass, Virginia sweetspire, and Butterfly Weed); an increase from 17% in 2011.

In addition to the consumer survey on the Mississippi Medallion Program, a producer survey was conducted to determine the impact of the campaign. The producers were surveyed each year on the year's winners and how it affected sales of the Native Plant of the Year. As shown below, Gulf Muhly Grass increased by 36% and the Virginia Sweetspire increased by 93% in production and sales. Although actual sales figures were not available from businesses, the producers have increased sales, as the survey verifies, therefore increasing revenues.

Table 2. Producer Survey Results Showing Number of Plants Sold Prior to the Campaign and in the Year of the Campaign

Native Plant of the Year	Number of Plants Sold in the Year Prior to the Campaign	Number of Plants Sold in the Year of the Campaign
Gulf Muhly Grass	626	855
Virginia	557	1,077

Sweetspire		
Total Plants Sold	1,183	1,932

Even though the grant has ended, MNLA plans to continue the Native Plant of the Year. Sweetbay Magnolia has already been chosen as the 2013 winner.

Beneficiaries

The entire 'green industry' in Mississippi as a whole, benefited from this initiative. Through education, landscapers have become more informed about native plants and design for sustainability. Mississippi nursery growers have also benefited; through this initiative, growers were made aware of native plants that will produce well and should be in demand during the upcoming season. Retail nurseries benefited from the initiative; because it gave them confidence in promoting certain plants to consumers knowing that it has been tested for performance in the state and is being promoted by their peers.

Mississippi consumers will also benefit from this project. By becoming more aware of native plants and knowing that these plants are produced by local producers, consumers are able to make better choices for plants to landscape their homes; while at the same time conserving water and energy.

Survey results showed a significant increase in production and sales of the plants chosen for the "Mississippi Medallion Native Plant of the Year" in both 2010 and 2011.

Lessons Learned

During the first year of the grant, the executive secretary, who served as the executor of the grant, and the Extension Horticulturist and MNLA Special Advisor both resigned from their positions. The loss of these two employees proved to be a challenge to the grant.

The MNLA feels that while television commercials were beneficial in promoting the initiative, print materials and internet promotions may be more beneficial due to the fact that it is easier to refer back to and access.

The MNLA understands the potential impact of promoting green and sustainability plants in our landscapes and was pleased to see the degree of increase in sales by producers.

As with the previous grant, the MNLA still feels that it is a challenge to familiarize consumers with the specific names of plants. Hopefully with continued promotion and education, in the future this will not be the case.

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Additional Information

The following are images of the Mississippi Medallion Winners and an article from *Mississippi Gardener* magazine.



SCBGP FY2011 Final Report Template



2010 AND 2011 MISSISSIPPI MEDALLION PLANTS

The Mississippi Medallion program was established in 1996 by the Mississippi Nursery and Landscape Association to increase awareness of plant materials and to promote sales and production of ornamental plants in Mississippi. The Mississippi Medallion Plant Committee members include growers, landscapers, researchers and extension personnel, and they work together to make recommendations on selection of Mississippi Medallion Plants. With financial support through Specialty Crop Block Grants from the USDA and Mississippi Department of Agriculture and Commerce, a "Mississippi Native Plant" was also chosen in 2011.

2010 MISSISSIPPI MEDALLION PLANTS

Electric Lime coleus (*Solenostemon scutellarioides* UF04335)

Characteristic: Sun or shade annual; sun-tolerant coleus

Electric Lime coleus came from a breeding program at the University of Florida and does well in both sun and shade (at least 3 hours of sun). It can reach 2 feet tall and as wide. Lime green foliage is decorated with yellow-green veins. It is great for flowerbeds, containers and hanging baskets. Removing the white flowers can extend the plant's performance through late summer. Companion plants for Electric Lime coleus could be other coleus with red or purple foliage such as Kong coleus (2006 Mississippi Medallion Winner), and other dark-leaved plants including 'Purple Knight' *Alternanthera dentata* (2005 Mississippi Medallion Winner).



Electric Lime coleus

Purple Flash ornamental pepper (*Capsicum annuum*)

Characteristic: Sun annual; drought and heat tolerant

Purple Flash ornamental pepper has unique, exotic-looking dark purple, almost iridescent foliage with the youngest leaves flashing white, green and bright purple. Purple flowers will then top the plant with small, glossy, round chickpea-sized bright red "pearls" changing to dark purple fruits. Fruits are extremely hot and not recommended for eating. Like its vegetable relatives, Purple Flash ornamental pepper is very heat tolerant. Plus, it is drought tolerant. Low maintenance will not hurt the beauty of the plant. It has a mounded growth habit and grows to a foot tall and up to 2 feet wide. It can be used in flowerbeds or containers, and mixes well with any summer green colors.



Purple Flash ornamental pepper

'Fireworks' gomphrena (*Gomphrena* 'Fireworks')

Characteristic: Sun annual;

tons of flowers

'Fireworks' gomphrena produces more flowers than almost any other gomphrena. It has large pink flowers decorated with yellow anthers on long stems and is prettier than other landscape gomphrena cultivars. When planted after frost, it grows to about 3-4 feet tall and wide, and flowers from late spring to frost with great tolerance of Southern heat and drought. Because of the huge number of flowers, 'Fireworks' puts on a magnificent "flower show" by itself, and can be grown as a cut flower or for drying.



'Fireworks' gomphrena

Gulf muhly grass (*Muhlenbergia capillaris*)

Characteristic: Native perennial grass

This 3- to 4-foot tall grass has delicate pink blooms that rise above fine-textured blue-green foliage like soft clouds or cotton candy from September to November, and remain attractive into winter. It is drought tolerant, trouble free and suitable for difficult areas including traffic islands. It could be used in containers or planted singly or in groups in the landscape, and mixes well with other grasses or plants with contrasting textures. There is also a white form available, *Muhlenbergia capillaris* 'White Cloud'.



Muhly grass

2011 MISSISSIPPI MEDALLION PLANTS

SunPatiens (*Impatiens* spp.)

Characteristic: Impatiens for the sun

The name says it all – impatiens for the sun. There are 15 SunPatiens cultivars, including six vigorous SunPatiens (3-4 feet tall and wide, including one variegated cultivar), two variegated spreading SunPatiens (3-4 feet tall and wide) and seven compact SunPatiens (2-3 feet tall and wide). Flower colors include white, pink, lilac, lavender, magenta, orange, salmon and red. The SunPatiens have been performing very well at the Crystal Springs field trials, flowering from shortly after transplanting to frost. Sufficient water and soil with good drainage are two key factors for SunPatiens to perform well under the Mississippi summer heat.



'Aristotle' bell pepper (*C. annuum*)

Characteristic: Vegetable

'Aristotle' produces green to red bell peppers with thick walls and has tremendous yield potential. 'Aristotle' has been reported to be among the best producers of green or colored bell peppers in many field trials. In one trial, 'Aristotle' produced 134 tons per acre of blocky peppers, much more than 'Bennington', 'Camelot', 'Colossal', 'Conquest' or 'Defiancee' (90, 68, 11, 82, and 73 tons/acre, respectively). It usually takes 72-75 days from transplanting to picking the first pepper. The pepper has a nice smooth shape and each could weigh about a third of a pound.



Virginia sweetspire

(*Ilex virginica*)

Characteristic:

Native shrub, deciduous

Virginia sweetspire is a native shrub that does well under full sun to partial shade. The species itself could grow to 3-6 feet tall in the landscape, but cultivars such as 'Little Henry' reach about 2 feet tall. In June, many 4- to 6-inch inflorescences made of numerous tiny fragrant white star-shaped flowers emerge and cover the shrub. In late fall, the foliage turns to maroonish red before shedding off. It is an easy low maintenance shrub.



INVESTIGATION OF BEST MANAGEMENT PRACTICES FOR SPECIALTY CUT FLOWER PRODUCTION

Project Summary

This purpose of this project was to enhance the competitiveness of cut flower production in the state of Mississippi through research in the field and under high tunnel conditions for season extension production. Through this project, Mississippi State University investigated a wide selection of specialty cut flowers and various aspects of cut flower production including: soil amendments, fertilization, planting density, and transplanting date on the growth and yield of specialty cut flowers. Over 600 growers have received outreach education on specialty cut flower production and at least one grower started a cut flower business.

Specialty cut flowers, most often lacking storability and shipping ability, are normally not readily available from large wholesale producers. However, over ninety percent of the respondents in a survey said they would include specialty cut flowers in their next flower purchase. In addition, different from row crops, vegetable, fruit, and nut crops; cut flowers represent the highest value crop on a per acre basis. Field-grown cut flower production, in general, has low overhead and does not require a lot of capital to get started. Therefore, specialty cut flowers are a niche product for small- and medium-sized farmers with limited resources who mainly sell at local markets.

High tunnels are a low-input technology used for season extension production. Using high tunnels for season extension has shown potential in the Northeast and the Great Plain area for cut flowers and other fruits and vegetables. Growers are adopting the technology in Mississippi, but research information was lacking on how high tunnels can extend production season in Mississippi, especially in specialty cut flower production. The objectives of this project was to investigate specialty cut flower production under field and high tunnel conditions in Mississippi including 1) adaptability of a wide selection of specialty cut flower species and cultivars, 2) the effects of different types and levels of soil amendments on growth and yield of specialty cut flowers, 3) the effects of different levels of organic and conventional fertilizers on growth and yield of specialty cut flowers, and 4) making recommendations on best management practices in specialty cut flower production and convey this to growers.

This project does not build upon a previously funded SCBGP.

Project Approach

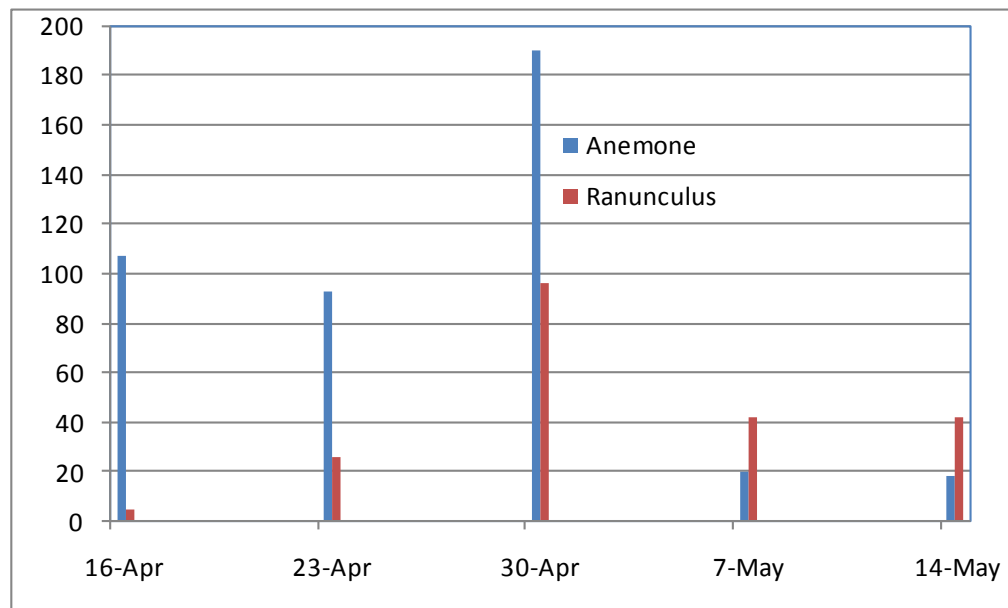
Two 30'x96' high tunnels were erected at Mississippi State University in the winter of 2009. One tunnel was designated for anemone and the other one for ranunculus. There were six 3'x96' beds within each tunnel tilled for the experiment. Each 96' long bed was evenly divided to 18 plots. Each plot was randomly assigned to a treatment combination of fertilizer and planting date. Fertilizer was incorporated in each plot prior to planting the ranunculus corms. Six different fertilizer treatments include: treatment 1, 100% inorganic fertilizer NPK 34-0-0 (20g per plot) + 0% organic fertilizer; treatment 2, 50% inorganic fertilizer NPK 34-0-0 (10g per plot) + 50% organic fertilizer (135g per plot); treatment 3, 50% inorganic fertilizer NPK 34-0-0 (10g per plot) + 0% organic fertilizer; treatment 4, 0% inorganic fertilizer + 50% organic fertilizer (135g per

plot); treatment 5, 0% inorganic fertilizer + 100% organic fertilizer (270g per plot); and treatment 6, 0% inorganic fertilizer + 0% organic fertilizer. There were three planting dates two weeks apart. Ranunculus corms were planted on February 19, March 5, and March 19, 2010. Anemone was planted on February 26, March 12, and March 26, 2010. Both plants were planted at 6" apart.

Flowers were harvested from the week of April 16 to the week of May 14, 2010. The total number of flowers harvested from the high tunnel was 428 stems for anemone and 211 stems for ranunculus. The average diameter of the flowers was around 7cm for both anemone and ranunculus. There was no significant difference among the treatments, which was probably due to flooding of the tunnel after winter rain, and that a significant portion of the plants did not germinate.

Two 2'x7' plots were randomly selected in each of three 30'x96' high tunnels and planted with zinnias and snapdragons (6' apart), on March 12, 2010, and repeated on April 9, 2010. Zinnias were harvested beginning May 3, 2010. The total number of stems harvested was 652 for the first planting date and 317 for the second planting date. The diameter of flowers harvested from both planting dates averaged 8.3 cm. Harvest of snapdragons from the first planting date was from May 10 to May 24, 2010. Harvest of snapdragons from the second planting date occurred from May 31 to June 14, 2010. The number of snapdragons harvested from both planting dates was around 120 stems. The length of inflorescence was 19.2 cm for the first planting date and only 12 cm for the second planting date.

The chart below shows the number of stems of anemone and ranunculus harvested weekly from the high tunnel from April 16 to May 14, 2010.



The tables below show the number of stems and the diameter of zinnia flowers harvested from three 2'x7' plots per planting date in high tunnel.

	The Number of Zinnia Stems							
Planting Date	3-May	10-May	17-May	24-May	31-May	7-Jun	14-Jun	Total
3/12/2010	129	66	82	115	107	60	93	652
4/9/2010	52	16	12	20	114	41	62	317

	The Diameter of Flowers (cm)							
Planting Date	3-May	10-May	17-May	24-May	31-May	7-Jun	14-Jun	Average
3/12/2010	8.44	8.43	8.79	9.5	8.22	7.36	7.63	8.3
4/9/2010	8.18	9.09	9.33	8.4	8.25	7.46	7.28	8.3

The tables below show the number of stems and the diameter of snapdragon flowers harvested from three 2'x7' plots per planting date in high tunnel.

	The Number of Snapdragon Stems						
Planting Date	10-May	17-May	24-May	31-May	7-Jun	14-Jun	Total
3/12/2010	31	50	38	0	0	0	119
4/9/2010	0	0	0	27	49	52	128

	The Diameter of Flowers (cm)						
Planting Date	10-May	17-May	24-May	31-May	7-Jun	14-Jun	Average
3/12/2010	15.3	22.4	19.8				19.2
4/9/2010				16.7	10.27	9.16	12.0

Goals and Outcomes Achieved

The goal of this project was to develop best management practices for specialty cut flowers that can be recommended and conveyed to growers.

Numerous outreach activities were conducted to inform growers about high tunnel best management practices for specialty cut flowers. A website providing information relating to high

tunnel production has been developed and maintained,
<http://msucares.com/crops/hightunnels/index.html>.

Two field days and trade shows were organized to introduce high tunnel specialty crop production, with collaboration of Mississippi Department of Agriculture and Commerce, Mississippi Fruits & Vegetable Growers Association, and Mississippi NRCS. In-service training was provided to agriculture extension agents during the field days.

- 2011 High tunnel field day, Crystal Springs, MS. March 10 - ~300 attendees
- 2010 High tunnel field day, Crystal Springs, MS. March 11 --220 attendees

Presentations on high tunnel production were given during Cool Season Fruit and Vegetable Production Workshops organized by Mississippi Department of Agriculture and Commerce.

- August 27, 2009 Verona, MS - 29 attendees
- September 3, 2009 Jackson, MS - 54 attendees
- September 10, 2009 Hattiesburg, MS - 50 attendees

A two-day specialty cut flower conference was held in Memphis, Tennessee, which attracted 10 Mississippi attendees among over 80 attendees from 19 states on November 17-18, 2009. Presentations were given on high tunnel production to growers participating in the USDA/NRCS high tunnel cost share program on Feb 23, 2010.

Presentations on high tunnel production and cut flower production were given at the Fall Flower and Garden Fest at the Truck Crop Experiment Station at Crystal Spring, MS on October 16 and 17, 2009; October 15 and 16, 2010; and October 14 and 15, 2011. Each presentation attracted 20-50 attendees.

Beneficiaries

Over 500 growers have received outreach education on specialty cut flower production and have increased awareness of specialty cut flower production and profitability of cut flowers.

At least 20 growers expressed interest in adding specialty cut flowers in their production or starting a cut flower business, and at least one grower has started a cut flower business in Mississippi.

Including cut flower production in their agribusiness will help growers gain a more diverse product profile and this diversity will help growers reduce production risk.

Lessons Learned

The two high tunnels were flooded by the excessive winter rainfall in 2009, which severely affected the cool season flower trial. Additional trenches were dug to quickly drain precipitation from the high tunnel site.

The two high tunnels in the project were damaged by strong wind on Friday August 13, 2010. No funds were available to re-build the high tunnel to repeat or continue the high tunnel cut flower trial.

High tunnels are a great way to improve production and quality of cut flowers; however, it requires additional work to manage the structure and strong winds are a constant threat to the structure. Even if no strong wind is present in the area, a very localized current may cause

damage to the high tunnel and thus result in economic damage. Close monitoring of damaging weather is strongly recommended. With close management, high tunnels are a great tool for profitable cut flower production in Mississippi.

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Additional Information

Mississippi State University Extension publications relating to high tunnel, cut flower, and other ornamental plant productions (some with potential as cut flowers) have been developed. Additional publications focused on providing information on USDA financial assistance.

- IS1674 High Tunnel or Greenhouse?
Available: <http://msucares.com/pubs/infosheets/is1674.pdf>
- IS1794 Specialty Cut Flower Production: Meet the Markets
Available: <http://msucares.com/pubs/infosheets/is1794.pdf>
- P2560 Specialty Cut Flower Production Resources: Supplies
Available: <http://msucares.com/pubs/publications/p2560.pdf>
- P2559 Specialty Cut Flower Production Resources: References
Available: <http://msucares.com/pubs/publications/p2559.pdf>
- P2595 High Tunnel Suppliers.
Available: <http://msucares.com/pubs/publications/p2595.pdf>
- P2635 Metal Quonset High Tunnel Construction Costs
Available: <http://msucares.com/pubs/publications/p2635.pdf>
- P2684 Mississippi Medallion Plants: 2003
Available: <http://msucares.com/pubs/publications/p2684.pdf>
- P2688 Mississippi Medallion Plants: 2004
Available: <http://msucares.com/pubs/publications/p2688.pdf>
- P2685 Mississippi Medallion Plants: 2005
Available: <http://msucares.com/pubs/publications/p2685.pdf>
- P2686 Mississippi Medallion Plants: 2006
Available: <http://msucares.com/pubs/publications/p2686.pdf>
- P2687 Mississippi Medallion Plants: 2007
Available: <http://msucares.com/pubs/publications/p2687.pdf>
- P2671 Mississippi Medallion Plants: 2008
Available: <http://msucares.com/pubs/publications/p2671.pdf>
- P2642 Mississippi Medallion Plants: 2009
Available: <http://msucares.com/pubs/publications/p2642.pdf>
- P2641 Mississippi Medallion Plants: 2010

Available: <http://msucares.com/pubs/publications/p2641.pdf>

- IS1894 Mississippi Medallion Plants: 2011
Available: <http://msucares.com/pubs/infosheets/is1894.pdf>
- P2664 USDA financial assistance available for small farmers and organizations
Available: <http://msucares.com/pubs/publications/p2664.pdf>

Pictures of High Tunnel Storm Damage



YEAR-ROUND PRODUCTION IN HIGH TUNNELS: CROP SELECTION, SCHEDULING, AND CULTURE

Project Summary

High tunnel production, unheated greenhouse-like structures with retractable ends and sides, provide a relatively low cost modified environment for crop production. At the start of this project period in June 2009, high tunnel production in Mississippi was relatively new. A properly constructed high tunnel is well ventilated during the day and provides cold weather protection when closed at night. Growers using these tunnels are able to extend growing seasons, reduce environmental variability, increase yields, improve crop quality, and increase income. Over the course of this project, interest has increased in Mississippi, with growers needing basic information on crop selection, planting times, and cultural practices in order to have a successful high tunnel operation. The purpose of this project was to help direct market growers in the state and make informed decisions on crop selection, planting time, and cultural practices for specialty crop production in the high tunnels.

Vegetable, flower crops, and cultivar trials were conducted to provide growers and grower support personnel with research based information on these fundamental aspects of high tunnel production. Over the course of the project, more than twenty crops and fifty cultivars were tested in high tunnels in central Mississippi. Results indicated that lettuce, tomato, minor greens, herbs, and cut flowers could be quite profitable in tunnels; but care in selection, timing, and keeping the tunnels in production as many days as possible contributed to profitability. The work resulted in more than 1,000 direct contacts at field days and trainings, leading to a substantial reach of indirect contacts as well. The project witnessed growth of the number of high tunnels over the past three years in the state of Mississippi. Data from the project has been used in several grant applications and has aided in the development of interstate research and outreach teams with members from Alabama, Mississippi, Louisiana, Texas, and Arkansas. The project has also helped elevate the reputation and visibility of the Mississippi State University Truck Crops Branch and members of the project team, which in turn will lead to better service to the specialty crops industry in and around Mississippi.

This project does not build upon previous funding.

Project Approach

The purpose of this project being implemented by Mississippi State University (MSU) is to help direct market growers in the state make informed decisions on crop selection, planting time, and cultural practices for specialty crops in high tunnel production. During the first year of the project, construction of the high tunnels was completed and trials were conducted all three years of the project period.

Trials consisted of un-replicated and replicated crop and cultivars in high tunnels located in Crystal Springs, Mississippi. Crops and cultivars were selected based on researchers' experience and consultation with growers and extension personnel. Crops were tested for fall and winter production and timing within the two seasons. Trials also tested direct seeded and transplanted crops; the transplants were greenhouse-grown. Crops tested were either standard

conventional or organically grown. All trials were grown on raised beds, some with plastic mulch, and some without. All were drip irrigated, scouted weekly for pests and diseases, and harvested at market maturity. Harvested crops were graded, trimmed, and weighed using practices appropriate for each crop.

Crops evaluated in trials included: leaf lettuce, collards, cabbage, broccoli, spinach, tomatoes, sweet and hot peppers, Irish potatoes, sweet potatoes, eggplant, turnips, mustard, kohlrabi, yard-long beans, amaranth, pac choi, napa cabbage, basil, cilantro, parsley, cucumbers, summer squash, luffa and other gourds, zinnias, snap dragons, dianthus, sunflowers, strawberries, and papaya.

The project's activities and results were shared during spring high tunnel field days in 2010 and 2011, and at the Fall Flower & Garden Fest. In addition, results from trials within the project have been presented at trainings and seminars in Mississippi and Arkansas.

Goals and Outcomes Achieved

The main stated goal of the project was to create and deliver to growers preliminary recommendations for crops, cultivars, and production practices for several crops that can be profitably produced in high tunnels. We were able to achieve much of this goal during the project period. We tested more than two dozen crops in high tunnels. We collected yield and quality data on all but a few that did not perform well enough to produce harvestable crops. We delivered the recommendations through field days, presentations, trainings, individual contacts, and web postings.

Proposed measurable outcomes included adoption of cultivars and production practices recommended based on the results of this study, leading to increased yields, increased profits, and greater fresh, local produce availability. We also proposed creation of publications and web content.

Lastly, we anticipated that this project would lead to more support from other funding sources after our initial data is gathered and disseminated, leading to an even more robust program in support of specialty crops and direct marketing at Crystal Springs and throughout the state. This goal has been achieved. When the project began, we had one tunnel at Truck Crops, with commitments to build three more. We now have seven total high tunnels funded from several different sources leveraged from this program and other funds.

This project contained both short-term and long-term measurable outcomes. In order to assess progress toward these goals, project managers collected data at the conclusion of each of the three workshops and three field trips/farm tours and again approximately six weeks after the conclusion of the workshop series and field trips/farm tours.

Short-Term Outcomes:

We have gathered sound construction cost data and have generated significant preliminary and replicated yield data. We were able to show that several crops could be grown well and proved profitably in high tunnels in Mississippi (Fig 1), and as importantly, several were not very profitable. We were able to show that leaf lettuce could be grown well in high tunnels more than four weeks ahead of spring production in Mississippi. Lettuce yields have ranged from 0.2 to over 1.3 pounds per plant, depending on the cultivar and spacing. A repeat of a study of green

peas showed that the earliest of three plantings in Spring 2011 provided the highest yield, with yields diminishing with each subsequent two week delay in planting. Our work indicated that early cabbage and broccoli plantings are harmed by cool nights that resulted in small head size. Asian greens appear to hold great promise as cash crops for high tunnels in our region if markets can be developed.

We showed that early crops of English peas in tunnels had high quality and good yields if planted early enough but that heat in the tunnels reduced yields quickly in later plantings. We have also presented information on some very minor crops, such as microgreens and papaya (Fig. 2). We used our production data at field days and in presentations to illustrate that Asian greens, herbs and tomatoes were also good choices for production in high tunnels, producing very high profit potential (Table 1). Some not so successful crops included yard-long beans, edible gourds, and amaranth for greens. We also showed that very early squash plantings did not set fruit well while later plantings were very good crops for high tunnels, if a grower could attain a good price.



Figure 1. Harvested produce from several high tunnel crops raised in cultivar and crop timing trials at Crystal Springs in 2010.



Figure 2. Very minor crops were evaluated at Crystal Springs, including microgreens (left) and papaya (right).

Table 1. Hypothetical gross returns from high tunnel crops based on yield data from Crystal Springs, MS and regional market data

Hypothetical Gross Returns*						
Crop	Spacing	Value/ Plant	Value/sf	Value/tunnel	Days in Tunnel	Value/day/ tunnel
Lettuce	10 X 10 in. (0.7 sf)	1.00- 4.00	1.45- 5.80	2,543- 10,092	50	50-202
Collards	18 X 18 in. (2.25 sf)	2.00- 5.00	0.88- 2.22	1,056-2,664	70	15-37
Tomatoes	18 X 48 in (6.0 sf)	15.00- 40.00	2.50- 6.66	3,000-7,992	120	25-67
Summer Squash	24 X 48 in. (8.0 sf)	12.00- 24.00	1.50- 3.00	1,800-3,600	80	23-45
Basil	12 X 12 in. (1.0 sf)	3.00- 5.00	3.00- 5.00	3,600-6,000	70	51-86
Zinnias	6 X 6 in. (0.25 sf)	2.00- 6.00	8.00- 24.00	9,600- 38,400	150	64-256

*Assumes a 2000 sf tunnel, 1200 sf (60%) space utilization, direct high end markets
The project increased the knowledge base of the research team and attendees at field days and workshops, including extension personnel. The project helped advise clients on crop selection

and cultivar choices, as well as timing of planting and production. As outlined in the project proposal, project participants were expected to become more knowledgeable about production practices of various specialty crops, and become more aware of marketing options available for these crops. Our field days and workshops resulted in audiences of over 1,500 during the three years of the project.

We have trained more than 800 growers and agricultural support personnel (industry, federal and state workers) at four major field day events centered on high tunnel production and highlighting this project. Included in those trainings were more than 80 NRCS personnel in a series of statewide high tunnel trainings in 2011. We have also had the privilege of addressing NRCS Chief White and Deputy Secretary of Agriculture Merigan during the course of this work. Attendees at the Mississippi and Alabama Fruit and Vegetable Growers Conferences in 2011 were also exposed to the project. These audiences were each over 75 direct contacts, and over 200 indirect contacts. The project has also helped support our high tunnel webpages at www.msucare.com/crops/hightunnels. Team members have also presented high tunnel information on local, state, and even national television and radio programs.

The project has also increased the use rate for the facilities and expertise at the Truck Crops Station in Crystal Springs. The project has also helped support several large, interstate grant applications by the investigators and their colleagues.

Long-Term Outcomes:

The biggest long-term outcome of the project is the increase in the number of high tunnels and amount of high tunnel vegetable, herb and cut flower production in the state. This project is part of an overall effort to support high tunnel crop production in Mississippi and surrounding states. In 2008, there were fewer than ten high tunnels in the state. Now there are over 200, including 186 supported by USDA NRCS funds, and several dozen additional tunnels that have been erected without NRCS support. This project has provided information on crop and cultivar performance that research and extension personnel use to help guide growers in crop selection and production timing. It is expected that the foundation put down by results from this and related projects at the station will continue to support the specialty crops industry in the state for many years to come.

Data and training from this work supported farmers' markets as well. Sound high tunnel production has resulted in growers selling more product over a longer season at markets in Clinton, Jackson, Starkville, Hazlehurst, Crystal Springs, Madison County, Oxford, Tupelo, Ocean Springs, and several other locations around the state. For example, at Clinton, Foot Print Farms sold basil, tomatoes, early squash, and eggplant based on recommendations developed from this project.

Publications will be completed after the official end of the project period. These include scientific publications on our English pea project and our leaf lettuce project. A summary experiment station bulletin is being prepared that will summarize most of our high tunnel cultivar work to date and serve to complement the information we have and will continue to provide at field days and through our contacts and tweets. This work provided input and support to the Mississippi State University Extension Service report P 2635 Metal Quonset High Tunnel Construction Costs (<http://msucare.com/crops/hightunnels/pubs.html>).

The project has been leveraged in several grant applications. These have included the USDA Organic Research and Education Grants, the USDA AFRI Small Farm Prosperity program, the USDA International Scholars Program, and the USDA Specialty Crops Research Initiative. One

of the cooperators on the project recently returned from a trip to China with a Texas A&M-led group under the International Scholars Program. The project has also supported the Truck Crops Branch's long-term goal of increasing research output and training of students. This and other high tunnel projects on the station have proven attractive to students, and helped to support faculty efforts to attract graduate students to the station.

This project has supported interstate cooperation among research, teaching and extension personnel. Information from the project has helped shape decisions by university personnel in Arkansas, Alabama, and Louisiana.

Beneficiaries

Beneficiaries of the project have included new and existing specialty crop growers in Mississippi and Alabama, and Arkansas, extension and service personnel in Mississippi and other states, USDA NRCS personnel, and Mississippi Department of Agriculture and Commerce staff. More than 500 growers and gardeners have toured the research site over the life of the project. More than 100 NRCS and university staff members have toured and trained at the site.

The project has also helped elevate the status and visibility of Truck Crops and members of the project team. Growing the public status of the team at Truck Crops and of the specialty crops research and outreach programs at Mississippi State will help develop and retain strength in the specialty crops industry for years to come.

Lessons Learned

Data indicated that lettuce can be quite profitable, although profit appears dependent on cultivar selection and spacing. Standard field-based spacing of large-frame commercial cultivars (10 inches in the row) produced the best and most uniform yield in a spring 2011 trial.

Early spring crops of cucumber, squash, and tomato were subject to cool temperatures early in their growth cycles leading to significant, though not totally unexpected, yield reductions. The cucumber and squash produced no male flowers and had few pollinators available early in their reproductive cycles, reducing early yields. As in 2010, both went on to produce good yields, however. It may be possible to delay planting of these crops a couple of weeks in the tunnels to overcome some of the adverse temperature problems.

A repeat of a study of green peas has shown that the earliest of three plantings in Spring 2011 provided the highest yield, with yields diminishing with each subsequent two week delay in planting.

Our work indicates that early cabbage and broccoli plantings are harmed by cool nights that result in small head size. Asian greens appear to hold great promise as cash crops for high tunnels in our region if markets can be developed, with pac choi being particularly noteworthy. Napa cabbage cultivars varied significantly in their performance. Garland chrysanthemum could be cut six or more times under our conditions, making this a potentially lucrative crop for some niche markets.

It is critical to have the right blend of crop selection, cultivar, and timing to maximize use of the high tunnels. We have come to realize that high tunnels can be managed similarly to how greenhouses, nurseries, or a retail store are managed: base your mix on dollars per square foot

per day. Not everything in the tunnel will be as profitable as everything else, but growers need to be mindful of costs and income from each crop and develop systems to produce income well above costs to justify the use of the high tunnels.

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FARMERS MARKET PROMOTION AND CERTIFICATION

Project Summary

The Mississippi Department of Agriculture and Commerce (MDAC) was granted an FY2007 Specialty Crop Block Grant, this funding developed a certification program for farmers markets in Mississippi. MDAC was also awarded a FY2008 grant providing additional funding to continue and expand the Mississippi Farmers Market Certification Program and to promote the markets that participate in the program. The goals of the project were to 1) continue identifying which farmers markets in the state are operating as a true “farmers market;” Mississippi growers selling their crops direct to the public; 2) expand the Mississippi Farmers Market Certification Program to include additional markets; and 3) highlight each of the “Mississippi Certified” farmers markets and Mississippi’s specialty crops through promotional efforts.

With the increased popularity of local food, the term farmers market is often used in a variety of settings. Previous funding implemented the Certified Farmers Market program to allow those participating to gain recognition and credibility among their consumers. Consumers shopping at these markets can be confident in knowing the produce they purchase is grown in Mississippi. A farmers market qualifies to become certified if there are at least two growers and at least half of the products sold at the market are grown on Mississippi soil.

Project Approach

In the spring of 2009, 2010, 2011, and 2012, MDAC distributed packets to all known farmers markets in the state of Mississippi. These packets included information about the Certified Farmers Market Program, including the guidelines and the application. Once applications were received from markets requesting certification, MDAC field staff visited each market to verify that it was a true farmers market, with farmers selling produce that they grew; not a flea market or roadside stand.

Markets that obtained certification were sent a banner to display at the market with the Mississippi Certified Farmers Market logo. The markets were also given logo stickers, logo pricing cards, and permission to display the logo in promotional advertisements and materials. Press releases were sent to the Certified Farmers Market’s local newspaper to inform the public of the certification. Financial assistance grants, up to \$300, were made available to assist the farmers markets in print advertising to promote specialty crops in their farmers market in 2009, 2010, and 2011.

A listing of the Certified Farmers Markets was available throughout the summer months of 2009, 2010, 2011, and 2012 in the *Mississippi Market Bulletin*, which reaches over 47,000 subscribers. A list of the all the farmers markets and Certified Farmers Markets across the state are listed on the MDAC website, <http://www.mdac.state.ms.us/>; Mississippi State University Extension Service, <http://msucares.com>; and the Mississippi Fruit and Vegetable Growers Association, <http://msfruitandveg.com>.

MDAC also developed a brochure in conjunction with the Mississippi Development Authority to promote farmers market. The two agencies shared the cost of the brochures since it also featured other agritourism opportunities in the state.

A guide listing local farmers markets in the state, *A Guide to Mississippi Farmers Markets*, was developed and distributed to various media outlets in 2010 including 96 weekly newspapers, 20 daily newspapers, and 5 business journals across the state. The guide was kept up to date each year for distribution purposes. This also served as a guide for farmers interested in selling at farmers markets, as a resource showing where the markets were located, and it was also available to those growers attending educational workshops presented by MDAC.

Surveys, conducted by MDAC, were sent to all farmers' market managers across the state to collect information on the current and previous years' vendors, growers, and shoppers at the market. Data from years 2008-2011 are discussed in the following section.

MDAC also conducted a workshop for farmers market managers on May 10, 2012. The workshop covered a variety of topics including: Social Media: How to Make Your Business Grow, The 3 V's of the Virtual Handshake, Permit Requirements for Vendors, Certified Farmers Market Program update, and a Farmers Market Roundtable Discussion. Two managers of successful markets also presented how they have incorporated social media into their marketing strategy. Forty-four managers and market volunteers/staff attended the workshop.

Goals and Outcomes Achieved

The goals of the certification program were to 1) contact existing farmers markets and continue to identify new farmers markets and educate them on the Mississippi Farmers Market Certification Program, 2) expand the Mississippi Farmers Market Certification Program to include additional farmers markets and 3) highlight each of the Mississippi Certified Farmers Market and Mississippi specialty crops through promotional efforts. All of mentioned goals were achieved over the course of this grant period.

Once the application packets were received by MDAC, the field staff was notified, and the respective area agent was responsible for making on-site visits to the potential Certified Farmers Market. Consumer Protection, a division of the MDAC, ensured the market had at least two producers and at least 50% of what was sold at the market, was grown on Mississippi soil. Once the markets were certified, MDAC submitted a press release to the market's local newspaper informing the public of the certification. A promotional banner, stickers, and price cards with the Mississippi Certified Farmers Market logo were mailed to the certified markets to be used for promotional and marketing efforts.

In 2008, when this program began, there were 49 farmers markets located across the state; this has risen to 70 today. This is an increase of over 43% in the past five years. An expected outcome of the farmers' market certification program was to increase interest among farmers markets to operate as a true farmers market with Mississippi growers selling produce that was grown by them. It was expected that 50% of the markets would participate in the certification program by 2009, and at least 75% of the markets would be participating in the program by 2010. This was not achieved in 2009. However, results are still noteworthy, considering the program is a volunteer program, and participation is not mandatory. In year two of the project,

MDAC revised the expected outcome to achieve 50% participation in 2010 rather 75%. This target was achieved in 2010. In 2011, the number of certified markets fell to 33% participation; this was likely due to the fact that vendors were asked if they had the required food permits for certain items.

The chart below illustrates the total number of markets in the state and the number of markets participating in the Mississippi Farmers Market Certification Program annually.

Year	Total Markets in MS	Certified Markets in MS	Project Outcomes	
			Expected % of Markets Certified	Actual % of Markets Certified
2008 ¹	49	19	---	39%
2009 ²	54	19	50%	35%
2010	58	29		50%
2011	58	19		33%
2012	70	26		37%

¹ Year the program was initially established with funding from the FY2007 SCBGP.

² Year the program was funded through the FY2008 SCBGP

³ Number of farmers markets that have been certified thus far for the 2012 year, year the FY2008 SCBGP ended, will continue for FY2012

It was also expected that the number of consumers shopping at farmers markets will increase by 15 percent from 2008 to 2011. This expectation was met. In order to measure this, a survey sent to farmers' market managers across the state was conducted to determine the customer traffic as well as the number of vendors at each market. The surveys were conducted yearly from 2008-2011. Results are depicted in the table below. Overall, the farmers markets across the state have experienced a positive increase in the number of grower or farmer vendors selling at the markets and an increase in the number of the customers/shoppers. From 2008 to 2009, 67% of markets experienced an increase in shoppers with the average increase of shoppers being 41%. From 2009 to 2010, 86% of markets witnessed an increase in the number of shoppers and number of farmer vendors. The average increase of shoppers and farmers selling at the market was 24% and 34%, respectively. From 2010 to 2011, 74% of markets witnessed an increase in the number of shoppers with the average increase being 30%. Also, 63% of the markets experienced an increase in the number of farmers selling at the market, with the average number of farmers increasing by 23%.

Years	Expected Outcome	Actual Outcome			
		% of Markets Experiencing Shopper Increase	Average % of Customer Increase	% of Markets Experiencing the Number of Grower Vendors Increase	Average % of Number of Grower Vendors Increase
2008 to 2009	The number of consumers shopping at farmers market to increase by 15% from 2008 to 2011.	67%	41%		
2009 to 2010		86%	24%	86%	34%
2010 to 2011		74%	30%	63%	23%

The goal of the workshop was to educate farmers market managers on way to enhance and promote their farmers market and ways to make their markets more attractive to consumers. This was accomplished by holding a one day workshop for market managers. It was expected that 25 markets will be represented through attendance at the workshop. Forty-four participants attended representing 22 markets. Although the target was not met, the workshop was still extremely successful.

Beneficiaries

The Certified Farmers Market program has proved to be very successful in its efforts to identify and promote true farmers markets across Mississippi. The increase in the number of Certified Farmers Markets has benefited the farmers markets, growers selling at these markets, farmers' market shoppers, and the specialty crop industry. From this grant, anywhere from 19-29 farmers markets have directly benefited each year.

As previously mentioned, the number of markets has grown from 49 to 70, with more markets expected to open in the near future, making it even more important to recognize true farmers markets. The term "farmers market" is loosely used today, to describe produce markets that sell fruits and vegetables from vendors that include peddlers and wholesalers rather than directly from farmers. This project gives brand recognition to farmers markets with Mississippi farmers selling produce grown by them. By participating in this program, markets became branded as a true "farmers" market and gained recognition and credibility among consumers and Mississippi growers. Consumers can be confident that they are buying the locally-grown produce that they desire. By identifying and promoting these farmers markets, more Mississippi grown fruits and vegetables are being sold through farmers markets and consumed by the public. This, in turn, benefits specialty crop growers. More shoppers at local markets translate into increased sales of specialty crops, therefore increasing specialty crop growers' income.

In addition, this program allowed MDAC to establish greater contact with these markets making it possible to keep markets aware of educational, grant funding, and technical assistance opportunities. The program was also valuable to those in the planning stages of establishing new markets. For markets desiring to be a part of this program, they initially developed guidelines for market operations in a way that would make them eligible to participate.

One of the most unexpected outcomes that occurred due to the success of the program was the passage of a sales tax exemption law for certain items sold at farmers markets certified by the Mississippi Department Agriculture and Commerce. The Mississippi Legislature recognized the importance and legitimacy of this program and passed a law that exempted Mississippi producers and specialty food vendors selling processed foods (made by the vendor) from an MDAC certified market from collecting and remitting sales tax on those items [MS Code Ann. § 27-65-103 (f)]. This law is very helpful to farmers that sell not only produce but that also sell value-added products that they make as well. In the past, the farmers have not had to remit sales tax for fresh un-processed produce that they sold, but they were required to submit sales tax for any processed items that they made and sold, such as jams and jellies. This often created difficulties for growers. This new law exempts them from remitting the sales tax on these processed food items but only if the products are sold at a farmers market participating in the certification program. This Mississippi Department of Agriculture and Commerce is working closely with the Mississippi Tax Commission to ensure that this law is being properly implemented.

Along with the tax exemption law that was passed for processed items sold at Certified Farmers Markets, a certification program was developed so that home-kitchens can be permitted as an approved source for vendors selling value-added processed foods at farmers markets that are certified by the MDAC. A cooperative agreement between the Mississippi State Department of Health (MSDH), the Mississippi Department of Agriculture and Commerce, and the Mississippi State University Extension Service, implemented this program and conduct Food Safety Trainings across the state. In the past, home kitchens could not be permitted to prepare processed food items that are sold to consumers. This has always created difficulties for those wanting to sell processed foods at farmers markets because vendors do not have the means to build a separate kitchen for the food preparation.

Lessons Learned

The Mississippi Farmers Market Certification Program has been the most successful activity that MDAC has implemented to identify and promote true farmers markets across the state. The benefits experienced by participating markets proved to be greater than originally planned. Not only have farmers market managers benefited and enjoyed the program, farmers selling at these markets have as well. The managers have successfully utilized the promotional items such as the stickers and pricing cards. Surprisingly, some managers have suggested making the guidelines more stringent in terms of increasing the number of farmers that must sell at the market in order for it to be certified.

As the number of farmers markets across the state has increased 43% over the past five years, this number is expected to continue rising, as does the number of Certified Farmers Markets. Consumers are demanding to know where their food comes from, they can be sure that when

buying from any of the Certified Farmers Markets across the state, they are buying directly from the source.

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Additional Information

Below is the Mississippi Certified Farmers Market logo, used on stickers, pricing cards, banners and print advertisements.



CERTIFIED FARMERS MARKET PROGRAM REGULATIONS

In order to be recognized by the Mississippi Department of Agriculture and Commerce (“MDAC”) as a “Mississippi Certified Farmers Market” the following criteria must be met. (This does not prohibit a market from imposing more stringent requirements on its vendors.)

Definitions:

1. “Certified Farmers Market” means a place, structure or building that is used by 2 or more Mississippi growers on a frequent basis for the direct sale of their on-farm produce and/or food products to consumers.

2. "Grower" means a person or farming operation that grows or produces agricultural products.
3. "Home processed food products" means food products made in the vendor's home and that:
 - a. are processed according to applicable local and state laws; and
 - b. are labeled with the vendor's name, address, telephone number, and ingredients and all other requirements of state law.
4. "Vendor" means any individual or farmer who is authorized by a certified farmers market to occupy space within the market.

Eligibility- A farmers market must meet the following criteria to be certified by the Department:

1. At least 50% of the agricultural products offered for sale must be produced by the grower or under the grower's direction within the State of Mississippi.
2. A grower or grower representative must be present during market hours when his/her products are offered for purchase.
3. Market must be operated by a grower's association; a certified, non-profit organization; or a government entity (state, county, municipal, tribal, etc.).
4. Markets can allow the sale of non-food products (arts, crafts, plants) and other products at the market's discretion.

BEEKEEPING COST-SHARE PROGRAM

Project Summary

The Mississippi Beekeepers Association (MBA) recognized the growing interest in beekeeping across the state. The public is becoming aware of the shortage of bees (both wild and domestic) due to diseases such as Colony Collapse Disorder and parasites. This increased awareness has led to the public wanting bees to pollinate their gardens and orchards. With the decline in wild and managed honey bee colonies, it is important that populations of honey bees be maintained to meet pollination needs.

The Mississippi Beekeepers Association (MBA) implemented a cost-share program to assist new beekeepers with getting started in the beekeeping business. Through the program, 50 eligible beginning beekeepers were reimbursed for 50 percent of the cost incurred to purchase honey bee boxes, honey bees, and supplies necessary for two colonies. This cost-share program is a continuation of the cost-share program which was funded by the Specialty Crop Block Grant Program— Farm Bill which allowed funds to assist 60 eligible beekeepers in getting started in beekeeping.

Project Approach

MDAC collaborated with the Mississippi Beekeepers Association to implement a cost-share program to assist new beekeepers with getting started in the beekeeping business. Through the program, 50 eligible beginning beekeepers were reimbursed \$180 which covered 50 percent of the cost incurred to purchase honey bee boxes, honey bees, and supplies necessary for two colonies. The program was structured to work one of two ways: 1) Participants purchasing two hives were reimbursed for 50 percent of the cost (equivalent to one hive) from the MBA, or 2) Participants providing written proof they purchased equipment to establish one hive or purchased protective gear at an equivalent cost to wear while working the hives received funds to purchase one bee hive. In order to be eligible for cost-share funding, participants could not currently have established colonies nor could anyone in his/her immediate family (father, mother, sibling, grandparent, father-in-law, mother-in-law, brother/sister-in-law). To ensure program success, selected participants were required to participate in a mandatory workshop and maintain necessary records.

The program was advertised in the monthly beekeeping newsletter, "Bee News & Views." Applications were mailed, email, and faxed to applicants upon request. They were dated as to the date received and processed in that order. Once proof of purchase and establishment were documented, reimbursements were made.

By implementing this program, it became apparent that many people desire to start beekeeping. It was expected that the funding from this grant would be available for three years especially since this was a continuation from a previous grant. However, funds were exhausted in 24 months. As a result, the MBA applied for and was approved for FY2010 Specialty Crop Block

Grant Funding to continue this successful program which will allow 70 additional beginning beekeepers to receive financial assistance. The MBA also received FY2010 funding to continue hosting educational workshops for beginning and advanced beekeepers which are vital to making the cost-share program successful.

The Beekeeping Cost-Share Program has seen phenomenal interest from individuals wanting to get started in beekeeping. Since the start of the initial cost-share program, 266 applications have been received. Of these applications:

- 60 beekeepers have met all requirements and received reimbursement through SCBGP- Farm Bill Funding
- 50 beekeepers have met all requirements and received reimbursement through SCBGP- FY 2008 Funding
- 8 beekeepers have met all requirements and received reimbursement through SCBGP- FY 2010 Funding
- 148 beekeepers are either waiting to meet the requirements, decided not to participate after learning all that is involved with beekeeping, or have began beekeeping on their own without financial assistance.

Goals and Outcomes Achieved

The goal of this project was to introduce 50 individuals to the beekeeping industry. The MBA met this goal by providing assistance to 50 beginning keepers. These individuals have already purchased their hives and equipment and are active in beekeeping.

It was expected that by making the cost-share program available to beginner beekeepers that the number of beekeepers in Mississippi would increase by 5 percent by 2011, compared to that of 2008. In 2008, there were approximately 1,000 beekeepers in the state, including both commercial and hobbyists. The MBA met this expected outcome. With the 50 new beekeepers, the number of beekeepers has increased by 5 percent from 2008 to 2011. The actual number of new beekeepers may have increased even more than 5 percent.

It is important to note that the pounds of honey produced per colony in Mississippi have increased from 92 pounds in 2007 to 104 pounds in 2009, a 13 percent increase. The pounds per colony produced in 2010 were 98. Although lower than the previous year, this is an increase from 2008.

A long-term goal/outcome that the MBA expects is that some these new beekeepers will become professional apiculturists. A trend in the beekeeping industry is that a large number of new beekeepers have been unable to purchase bees for beekeeping because the bees were not available at the time needed. Some became discouraged and decided not to pursue beekeeping any further. The demand far exceeds the supply. Therefore, more commercial beekeepers are needed to produce bees to provide to new beekeepers are essential.

Beneficiaries

The direct beneficiaries of the cost-share program are the 50 beginning beekeepers that participated in the program. Specialty crop producers indirectly benefit from the cost-share program. With the decline in wild and managed honey bee colonies, it is important that populations of honey bees be maintained to meet pollination needs. Honeybees are the most economically valuable pollinators of agricultural crops worldwide. They pollinate approximately 130 agricultural crops including fruit, vegetable, fiber, and nut crops.

Lessons Learned

By implementing the cost-share program, the MBA learned the importance of requiring participants to attend a workshop to learn about beekeeping. It quickly became apparent that some of those desiring to become beekeepers did not fully understand what would be required of them in order to become a successful beekeeper. After learning the time, effort, and costs involved, some individuals chose not to follow through with the program. The workshops, especially the hands-on field activities, were a key factor in implementing a successful cost-share program that will produce positive results for years to come.

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DEVELOPING SPECIALTY CROP EDUCATION IN MISSISSIPPI

Project Summary

Mississippi has a long and successful history in the agricultural sector. Over the years, this state has been a national leader in cotton, catfish, poultry, and forest products. But, as competition on the national and international scene has evolved, it has become clear that some of the traditional agricultural crops are not as economically stable as once thought. This has inspired a lot of interest among our producers to shift to less traditional crops for their farm businesses. These have included a wide assortment of fruits and vegetables, among other crops. In recent years, there has been growing interest in specialty crops, however. Grower questions and concerns about greenhouse tomatoes and other vegetables, ethnic vegetables, shiitake mushrooms, organic vegetables, cut flowers, specialized fruit crops, and many other specialty crops are now a daily occurrence.

This project addressed the need to assist our Mississippi growers with the information required to shift into specialty crops production and develop successful farm businesses in a number of various crop alternatives. The project was motivated by the many calls from commercial producers asking for assistance with producing the various specialty crops referred to above. In a time when these growers are being subjected to economic problems during the current national crisis, educational assistance to help them pursue more lucrative specialty crops production was very timely.

This project was not previously funded through the Specialty Crop Block Grant Program.

Project Approach

The purpose of this activity implemented by Mississippi State University (MSU) was to further the education of Mississippi's producers in the area of specialty crops. This project was approached by implementing three primary activities -- The Greenhouse Tomato Short Course, the Mississippi Fruit & Vegetable Growers Conference and Trade Show, and the Fall Flower & Garden Fest.

Greenhouse Tomato Short Course

The Greenhouse Tomato Short Course was conducted March 9 and 10, 2010, at Eagle Ridge Conference Center in Raymond, MS. Growers from about 27 states across the United States, from Alaska, California, and Hawaii to Rhode Island, New York, and New Jersey attended the program to learn how to produce this highly specialized crop.

Attendance was about 130 people. Exhibitors were also an integral part of the program, with about 20 commercial exhibitors. Exhibitors came from South Dakota, Colorado, Florida, Louisiana, Connecticut, Ontario, Canada, and other areas.

This project provided funding for 5 speakers. The speakers chosen were recognized as experts in their respective field to insure the high quality of the program. These included speakers from across the country in addition to the Extension staff at Mississippi State University. This project

also funded improved promotion and publicity of the Short Course so that more growers would become aware of the program and take advantage of the opportunity of participating.

More information on the Greenhouse Tomato Short Course can be found on the website at <http://www.greenhousetomatosc.com>.

The Mississippi Fruit & Vegetable Growers Association Conference & Trade Show

The original proposal included funding for the support of the Deep South Fruit and Vegetable Growers Conference. The funds were to be utilized to pay travel for speakers at the conference. When this conference was canceled, a budget change was requested and approved to use those funds instead to support the Mississippi Fruit and Vegetable Growers Conference.

This conference was held January 13 and 14, 2011 in Natchez, MS, at the Natchez Convention Center. Funding was used to support the scholarships for two Extension Agents to attend. The scholarship paid for their travel expenses and conference registration. SCBGP funds were also used to help with the facility rental. This was very beneficial to the Mississippi Fruit and Vegetable Growers Association (MFVGA) in helping it get off the ground with their first in-state conference in many years. It is expected that this conference will continue to grow and be a great educational asset for the specialty crops producers.

More information on the Mississippi Fruit & Vegetable Growers Association can be found on the website: <http://msfruitandveg.com>.

Fall Flower & Garden Fest

The Fall Flower & Garden Fest was held at the Truck Crops Experiment Station in Crystal Springs on October 16 and 17, 2009. Total attendance for the event was approximately 4,216. The focus of the event was a 3-acre garden which is about half vegetables and half flowers. But, in addition to the main garden, the program included lots of educational seminars, demonstrations, walking tours, wagon ride tours, etc., to make the program as educational as possible.

This SCBGP grant was used to pay for 1) a portion of the promotional materials; 2) some of the seeds and garden supplies to make this event even better to help promote specialty crops (vegetables, flowers, herbs, etc.) to home gardeners and small producers in Mississippi.

More information on the Fall Flower & Garden Fest can be found on the website <http://msucares.com/fallfest>.

Goals and Outcomes Achieved

The goal of the activity is to enhance competitiveness of Mississippi specialty crops producers by 1) attracting excellent speakers; 2) promoting and marketing three educational programs; and 3) implementing these programs and delivering specialty crops information at the three venues. This was accomplished.

Greenhouse Tomato Short Course

The previous year's attendance was approximately 90 for Greenhouse Tomato Short Course. In 2010, however, about 130 participants from 27 states, plus Canada and Trinidad, made this one of the largest Short Courses in many years. This was a 44% increase in participation which is much higher than the expected 5% increase. Growers, exhibitors, and speakers all contributed to an excellent program. It is felt that the grant dollars used for promotion of the program above and beyond the normal level of promotion helped to reach more growers and helped to increase the number of participants.

Measurements of attendance were based on actual conference registrations.

Attendees were asked to fill out evaluation forms to assist MSU in measuring how effective the program was and also to plan for next year. Evaluation forms from the Greenhouse Tomato Short Course were filled out by 67 of the 130 participants for a 52 percent response rate. These were reviewed to determine outcomes of the training. Some of the most relevant comments included the following:

- 1) The speaker on engineering of greenhouse was too technical, and more geared towards larger greenhouses or those businesses with more resources to try various heating systems;
- 2) Information on organic production systems in the future was requested;
- 3) Nice not having as many vendors as speakers this year;
- 4) More growers who are speakers are needed;
- 5) Exhibitors were excellent and interesting;
- 6) Consider providing mini-workshops during / after the Short Course;
- 7) High Tunnel Workshop immediately after Short Course was a good idea; promote it more if do it again so more people can plan on going to it;
- 8) Great topics, great speakers;
- 9) Networking with other growers was valuable;
- 10) Include more on marketing next year.

There were 5,986 web hits from 4,342 different computers for the Greenhouse Tomato Short Course web site during this one-year time period. This was a 229.4% increase in web hits over the previous year, far exceeding the goal of a 5% increase.

Mississippi Fruit & Vegetable Growers Association Annual Conference

Previous year's attendance was approximately 450 for the Deep South Conference. The MFVGA conference had about 200 in attendance. This was the first year in quite a few that a separate conference was held in Mississippi as a Mississippi Fruit & Vegetable Growers Association Annual Conference, so comparisons in numbers between a single state and multi-state conference are not very meaningful. However, we feel that 200 was a very good number for the Mississippi conference.

Measurements of attendance were based on conference registrations.

All tasks outlined in the proposal have been completed.

Fall Flower & Garden Fest

Participation was 2,344 on Friday and 1,872 on Saturday. Attendance was somewhat impacted by unusually cool, wet weather, as well as exceptionally muddy ground around exhibitor areas. Numbers were down about 30% from the normal attendance of about 6,000 rather than increasing by the expected 5%. In spite of the weather, comments were very positive from speakers as well as the over 4,000 home gardeners in attendance. Measurements of attendance were based on a manual clicker at the entrance gate.

There were 11,707 web hits from 8,426 different computers for the Fall Flower & Garden Fest web site during this one-year time period. This was a 160.9% increase in web hits over the previous year, far exceeding the goal of a 5% increase.

Beneficiaries

The beneficiaries of the programs implemented in this grant were the commercial specialty crop growers of Mississippi, as well as some other states. These included greenhouse, hydroponic growers, small fruit, tree fruit, and field vegetable producers. Numbers of beneficiaries are as follows:

- Fall Flower and Garden Festival - 4216
- Greenhouse Tomato Short Course - 130
- Mississippi Fruit and Vegetable Growers Association Annual Conference - 200

While it is impossible to extract financial data from each of the producers who were the beneficiaries of this grant, it is clear from the responses, both oral and written, that the producers were very appreciative of the programs offered and would make excellent use of the information provided to them through these programs.

Lessons Learned

With the support of this Block Grant, excellent speakers were brought to the Greenhouse Tomato Short Course to make it a very successful educational program from specialty crop growers of hydroponically grown greenhouse vegetables; two MSU Extension Agents who would not ordinarily have the funding needed were sponsored with scholarships to participate in the Mississippi Fruit & Vegetable Growers Association Annual Conference; Fall Flower & Garden Fest was able to attract about 5,000 people each year to learn from the speakers, demonstrations, and gardens in place for their benefit.

There were no unexpected outcomes or results.

The goals and outcomes were achieved.

Contact Person

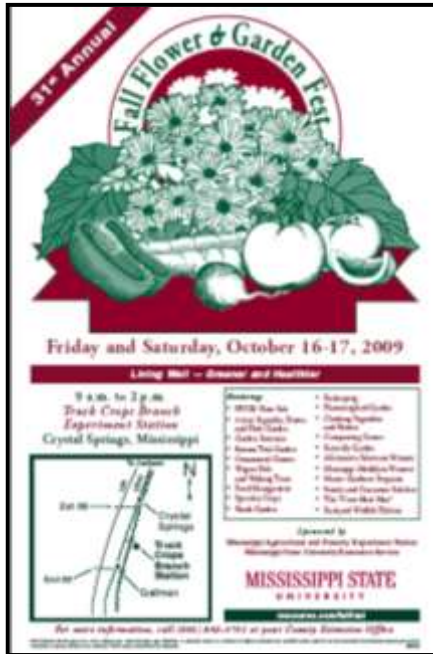
Rick Snyder
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Additional Information

The following websites were used to promote Fall Flower & Garden Fest, the Greenhouse Tomato Short Course, and the Mississippi Fruit & Vegetable Growers Association Annual Conference, respectively:

- <http://msucare.com/fallfest>
- <http://greenhousetomatosc.com>
- <http://msfruitandveg.com>

FALL FLOWER AND GARDEN FEST



Poster designed to promote the 2009 Fall Flower & Garden Fest.



Front of small card designed to promote the Fall Flower and Garden Fest.



A wide variety of flowers are on display at the Fall Flower and Garden Fest.

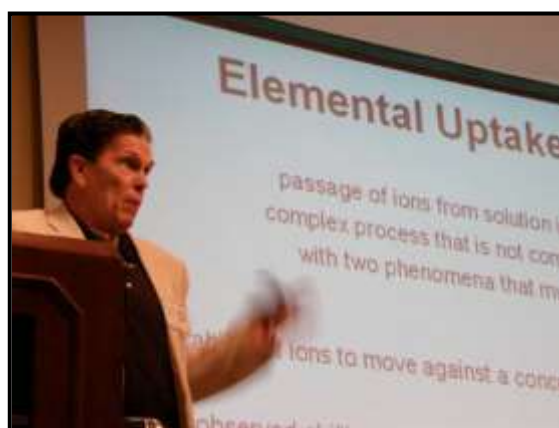


Cooking demonstrations utilizing fresh produce is part of the Fall Flower and Garden Fest.



The Fall Flower and Garden Fest gives growers the opportunity to see various varieties of a number of vegetable plants growing.

GREENHOUSE TOMATO SHORT COURSE



The Greenhouse Tomato Short Course attracted 130 growers from 27 states. This short course offers growers a one-of-kind experience as the quality of speakers can not be beat.